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REPORT TO THE SUBCOMMITTEE ON  
RETIREMENT AND EMPLOYEE BENEFITS  
COMMITTEE ON POST OFFICE  
AND CIVIL SERVICE  
HOUSE OF REPRESENTATIVES

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Comparing Incidence Of  
Diseased Tissue And Use Of Blood  
Between Military And Civilian Hospitals

B-164562

BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES

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Dec

ATTN. 6, 1973



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

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cl +  
R1 The Honorable Jerome R. Waldie  
Chairman, Subcommittee on Retirement  
and Employee Benefits  
Committee on Post Office and Civil Service  
House of Representatives

H 2906

Dear Mr. Chairman:

cg  
R1 This is our report on comparing incidence of diseased  
tissue and use of blood between military and civilian hos-  
pitals. This report, furnished in connection with your  
oversight of the Federal Employees Health Benefits Program,  
is in response to the May 14, 1973, request of the Chairman,  
Committee on Post Office and Civil Service. A copy of this  
report is being sent to him today. H 2906

In accordance with the Chairman's request, this report  
does not evaluate the medical data we obtained. At your  
request, we have not asked the Departments of the Air Force  
and the Army to review and comment on the military hospital  
data in this report.

We believe that the contents of this report would be  
of interest to other committees and Members of Congress and  
to various Government agencies. We do not plan to distrib-  
ute this report further unless you agree or publicly  
announce its contents.

Sincerely yours,

Comptroller General  
of the United States

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ABBREVIATIONS

CPHA	Commission on Professional and Hospital Activities
FEP	Federal Employees Health Benefits Program
GAO	General Accounting Office

COMPTROLLER GENERAL'S REPORT TO  
THE SUBCOMMITTEE ON RETIREMENT  
AND EMPLOYEE BENEFITS  
COMMITTEE ON POST OFFICE AND  
CIVIL SERVICE  
HOUSE OF REPRESENTATIVES

COMPARING INCIDENCE OF DISEASED  
TISSUE AND USE OF BLOOD BETWEEN  
MILITARY AND CIVILIAN HOSPITALS  
B-164562

D I G E S T

WHY THE REVIEW WAS MADE

In October 1972 the Chairman, House Subcommittee on Retirement and Employee Benefits, asked GAO to review the results of pathological reports for surgeries done in military hospitals and the use of blood during surgical procedures.

This data was requested as part of the Subcommittee's oversight of the Federal Employees' Health Benefits Program, administered by the Civil Service Commission. 13

Subsequently, GAO agreed to make a comparison of the incidence of diseased tissue after surgery between selected military and civilian hospitals.

Also, GAO agreed to compare blood use during gallbladder surgeries (cholecystectomy) at these hospitals and specifically to determine the number of patients who received one-unit transfusions. (See p. 20.)

In May 1973 the Chairman, House Committee on Post Office and Civil Service, asked GAO to report formally on results of the work. The Committee stated its belief and that of medical experts it consulted, that evidence supporting the possibility of unnecessary surgery could be drawn from a comparison of pathological reports at military and civilian hospitals.

The Chairman said GAO's report need not evaluate the data obtained.

The Departments of the Air Force and the Army, at whose hospitals the military data was obtained, have not had an opportunity to review and comment on the data in the report. Data was not available at Navy hospitals for 1971.

Background

The Subcommittee selected the surgical procedures for use in the comparisons. These included laminectomy, tonsillectomy, tonsillectomy and adenoidectomy, adenoidectomy, appendectomy, cholecystectomy, mastectomy, abdominal hysterectomy, and vaginal hysterectomy.

Tissue removed during these surgeries at military hospitals was coded for GAO by military pathologists using criteria the Commission on Professional and Hospital Activities established. The Commission, a nonprofit research organization, operates computerized medical record information programs for its over 1,500-member civilian hospitals. (See pp. 28 and 29.)

The Commission's coding system classifies the tissue removed during surgery as

--tissue disease which generally requires surgical removal,

--tissue disease where surgical removal is not clearly indicated from the pathological findings alone, and

--no disease.

Additional codes are used for those cases where (1) the pathologist did not code the tissue, (2) tissue was removed and no pathology report was made, and (3) no tissue was removed. (See pp. 8 and 9.)

GAO contracted with the Commission to provide data on tissue coding for selected surgeries and on blood use in cholecystectomies from a sample of 200 of its civilian member hospitals. The Commission furnished tissue-coding data on about 148,000 patients categorized by size of hospital, expected method of payment, census region, and type of hospital--teaching or nonteaching.

As a part of its contract with the Commission, GAO agreed to include the following statement in any use of the Commission's data.

"Basic data for use in this study were supplied by the Commission on Professional and Hospital Activities (CPHA), Ann Arbor, Michigan. In these data the identities of individual hospitals were not revealed in any way. Any analysis, interpretation, or conclusion by the U.S. Government based on these data is solely that of the U.S. Government and CPHA specifically disclaims responsibility for any such analysis, interpretation, or conclusion." (See p. 7.)

## FINDINGS AND CONCLUSIONS

### Diseased tissue

To compare incidence of nondiseased tissue removed during selected surgical procedures in military and civilian hospitals, GAO randomly selected 554 cases of 9,700 cases performed during 1971 at 19 Air Force and Army hospitals. The pathologist's tissue coding for these cases was compared with the tissue coding for cases included in the Commission's sample.

Overall, comparison of percentages of nondiseased tissue removed surgically at military and civilian hospitals did not show major differences.

In two of the nine types of surgeries (laminectomy and tonsillectomy and adenoidectomy) GAO sampled, military hospitals had statistically significant lower rates of removal of nondiseased tissue than did the civilian hospitals.

In the two types of hysterectomies, civilian hospitals had a lower rate than the military hospitals sampled, but the differences were not statistically significant. In the other five types of surgeries, there was almost no difference.

An important aspect of the comparison was that the tissue removed in about 15 percent (22,216) of the surgeries in civilian hospitals was not coded by the pathologist; therefore, no data was available for these cases. The Commission said some of its member hospitals did not, as a rule, include tissue coding on the patient abstracts sent to CPHA. (See p. 8.)

The Subcommittee expressed interest in the number of civilian hospitals where 10 percent or more of the patients for a particular procedure had nondiseased tissue. The Commission data showed that the number of civilian hospitals where this occurred varied depending on the type of surgical procedure. (See p. 18.)

Blood use

About 5 percent of cholecystectomy patients received blood at military and civilian hospitals during 1971. About 29 percent of those in military hospitals received one unit of blood whereas about 37 percent of those in civilian hospitals received one unit.

A direct comparison of military and civilian hospital blood use by rates of hemoglobin and hematocrit--measures of the condition of blood--is not possible because of the absence of detailed data on each patient's condition during or after surgery.

GAO obtained data from both military and civilian hospitals which showed the number of units of blood used in relation to the patients' hemoglobin or hematocrit rates at the time of admission to the hospital.

These rates may or may not have been the rates immediately before the surgery. GAO used them because they were the only rates that CPHA compiled for civilian hospitals. (See p. 21.)

## CHAPTER 1

### INTRODUCTION

By letter dated October 4, 1972, the Chairman, Subcommittee on Retirement, Insurance and Health Benefits (now Retirement and Employee Benefits), House Committee on Post Office and Civil Service, asked us to assist the Subcommittee by reviewing and providing, informally, information on pathological reports for selected surgeries done in military hospitals and the use of blood in performing surgical procedures. The data was requested for use in connection with the Subcommittee's oversight of the Federal Employees' Health Benefits Program (FEP), administered by the Civil Service Commission.

In subsequent discussions with the Subcommittee, we agreed to compare the incidence of diseased tissue after surgery between selected military and civilian hospitals and to compare the blood use, particularly one-unit transfusions, during gallbladder surgery (cholecystectomy) between these hospitals during 1971. The Subcommittee suggested the use of the Commission on Professional and Hospital Activities (CPHA), Ann Arbor, Michigan, as the source of data for civilian hospitals. CPHA operates a series of computerized medical record information programs based on input from its over 1,500-member civilian hospitals. CPHA--a nonprofit, nongovernmental, educational, and scientific research organization--was established in 1955 by the American College of Physicians, the American College of Surgeons, the American Hospital Association, and the Southwestern Michigan Hospital Council. According to CPHA, its goal is to increase the accessibility of information in medical records so the data can be used to greater advantage in improving the quality of patient care.

By letter dated May 14, 1973, the Chairman, House Committee on Post Office and Civil Service, requested that we provide a formal report to the Subcommittee on Retirement and Employee Benefits which would include (1) the results of our review of a sample of selected surgeries and blood use in military hospitals and (2) similar data obtained from CPHA for civilian hospitals. The Chairman said that it was the Committee's belief and that of medical experts it consulted that evidence supporting the possibility of unnecessary surgery could be drawn from a comparison of the pathological

reports on tissue removed during surgery at military and civilian hospitals.

The Chairman stated that the matter of unnecessary surgery had received increasing attention from many sectors over the past few years and that some authorities had said that about 2 million unnecessary surgeries were done each year in the United States. He also said "we believe that a study of surgical practices would provide us with information needed to insist upon stricter utilization controls in the FEP program."

In accordance with the Chairman's letter, this report does not evaluate the data we obtained. In view of the Subcommittee's particular interest in those cases in which the tissue was coded as nondiseased, the report highlights some of the tissue differences. We obtained professional medical assistance in compiling the data on military hospitals for this report.

The Departments of the Air Force and the Army have not had an opportunity to review and comment on the data we obtained.

#### MILITARY HOSPITAL DATA

The data in this report on patients in military hospitals was compiled from medical records on a random-sampling basis at selected Army and Air Force hospitals. (See app. I.) Navy hospitals were not included because the Navy's patient data system for calendar year 1971, the year selected for review, did not contain the data needed to select specific surgical procedures. Because we needed the advice and interpretation of medical records by medical librarians, we reviewed the records at only those Army and Air Force hospitals staffed by these professionals.

Since military hospitals treat dependents of active duty personnel and retirees and their dependents in addition to active duty personnel, they serve a variety of patients similar to civilian hospitals.

#### CIVILIAN HOSPITAL DATA

CPHA receives medical statistics continuously from its member hospitals as patients are discharged. For each

discharge, the medical records librarian at the hospital analyzes the patient's clinical record and records the information on a CPHA case abstract form. The hospital sends these abstracts, containing the diagnoses, operations, investigative procedures, therapy, and other facts of medical importance for each patient to CPHA, where the information is put on magnetic tapes. From these tapes, series of routine listings, indexes, and statistical reports are produced and sent to the hospitals for study and use. The reports display medical data ranging from the broad picture for all patients to specific details about each patient. CPHA currently receives data on about 13 million patients a year.

CPHA compiled the specific data in this report on patient tissue and blood use for 1971 from a sample file of 200 hospitals. Under a contract with us CPHA furnished tissue-coding data (see app. II) on all patients--148,426--who had undergone the selected surgeries at the sample hospitals and furnished blood use data for the 1,212 patients who received blood during cholecystectomy.

CPHA stated in a letter to us that:

"\* \* \* we feel that it [the 200 hospital sample] is representative of the U.S. population of non-federal short term general hospitals. This file was constructed by our statisticians to reasonably portray that universe of hospitals by census, region, size and teaching status."

CPHA uses the sample file to make comparative studies between hospitals.

In our contract with CPHA we agreed to include the following statement in any use of the CPHA data.

"Basic data for use in this study were supplied by the Commission on Professional and Hospital Activities (CPHA), Ann Arbor, Michigan. In these data the identities of individual hospitals were not revealed in any way. Any analysis, interpretation, or conclusion by the U.S. Government based on these data is solely that of the U.S. Government, and CPHA specifically disclaims responsibility for any such analysis, interpretation, or conclusion."

## CHAPTER 2

### INCIDENCE OF DISEASED TISSUE IN

### SELECTED MEDICAL PROCEDURES AT

### CERTAIN MILITARY AND CIVILIAN HOSPITALS

Overall, the comparison of the rate of nondiseased tissue removed by surgery at military and civilian hospitals does not show major differences. In two of the nine types of surgeries (laminectomy and tonsillectomy and adenoidectomy) we sampled, military hospitals had statistically significant lower rates of removal of nondiseased tissue than did the civilian hospitals. In the two types of hysterectomies, civilian hospitals had a lower rate than the military hospitals sampled, but these differences were not statistically significant. In the remaining five types of surgeries, there was almost no difference.

An important aspect of the comparison was that the tissue removed in about 15 percent of about 148,000 surgeries done in civilian hospitals was not coded by the pathologist; therefore, no data was available for about 22,000 cases. According to CPHA, some of its member hospitals do not, as a matter of course, include tissue coding on the patient abstracts sent to CPHA.

### RESULTS OF TISSUE CODING

The table on page 10 shows the results of tissue coding by type of surgical procedure and type of hospital during 1971. The data is shown using the CPHA tissue-coding criteria which include three codes for the pathologist to classify the type of tissue removed during surgery. These codes are:

- Diseased A, indicating tissue disease which generally requires removal by surgery.
- Diseased B, indicating tissue disease where removal by surgery is not clearly indicated solely from the pathological findings.
- No disease.

CPHA provides three additional codes:

- Not coded by pathologist.
- Tissue removed, no pathology report.
- No tissue removed.

Any determination as to the merits of surgical removal in disease B and no disease categories must include an analysis of the patient's medical history, symptoms, and physical findings, including X-ray and laboratory examinations before surgery. In accordance with the Subcommittee's instructions, we compiled the preoperative diagnosis for each surgery in the military hospitals included in our sample. The CPHA data was limited to the tissue coding; thus, we were not able to use the preoperative diagnosis data for comparative purposes in this report.

Although both the military and the civilian hospitals used the CPHA criteria in the coding of tissue, we have no way of knowing whether both the military and civilian pathologists uniformly applied the criteria.

# BEST DOCUMENT AVAILABLE

## Results of Tissue Coding During 1971 at Selected Military and Civilian Hospitals Percent of Occurrences--All Cases (note a)

<u>Procedure</u>	<u>Diseased A</u> (note b)	<u>Diseased B</u> (note c)	<u>No disease</u>	<u>Total</u> <u>coded</u>	<u>No report</u> <u>or</u> <u>not coded</u> (note d)
Laminectomy:					
Military	10.9	33.9	-	44.8	55.2
Civilian	20.6	13.8	6.8	41.2	58.8
Tonsillectomy:					
Military	74.5	25.5	-	100.0	-
Civilian	25.1	51.9	2.3	79.3	20.6
Tonsillectomy and adenoidectomy:					
Military	64.7	29.6	-	94.3	5.7
Civilian	17.7	55.8	4.0	77.5	22.5
Adenoidectomy:					
Military	74.1	15.1	7.2	96.4	3.6
Civilian	20.9	50.3	7.1	78.3	21.6
Appendectomy:					
Military	77.6	7.6	10.8	96.0	4.0
Civilian	64.6	10.2	10.7	85.5	14.4
Cholecystectomy:					
Military	92.3	5.4	-	97.7	2.3
Civilian	67.5	17.7	.6	85.8	14.1
Mastectomy:					
Military	97.2	2.8	-	100.0	-
Civilian	64.0	20.7	.7	85.4	14.7
Abdominal hysterectomy:					
Military	68.6	22.7	5.3	96.6	3.4
Civilian	54.0	28.4	3.7	86.1	13.9
Vaginal hysterectomy (note e):					
Military	37.8	46.8	14.2	98.8	1.2
Civilian	36.7	39.3	9.2	85.2	14.8
All:					
Military	68.0	22.1	5.7	95.8	4.2
Civilian	44.5	33.7	4.1	82.3	17.7

<sup>a</sup>May not add to 100 percent due to rounding.

<sup>b</sup>Tissue disease which generally requires surgical removal.

<sup>c</sup>Tissue disease where surgical removal is not clearly indicated from the pathological findings alone.

<sup>d</sup>Includes those cases where (1) the tissue was not coded by the pathologist, (2) tissue was removed, but no pathology report was made, and (3) no tissue was removed.

<sup>e</sup>The sample results on vaginal hysterectomies in the military hospitals showed a relatively large number of cases--23 of 105--where the tissue was coded as nondiseased. A closer examination showed that in eight of these cases the only reason for performing the surgery was for voluntary sterilization. Tissue removed in these surgeries would not be expected to be coded as diseased; therefore these cases were eliminated from the universe and sample. The results shown in the table for the military are net of the eliminated cases. The CPHA data is not net of voluntary sterilizations, because only 11 such cases were identified in the 10,761 vaginal hysterectomy patients. Eliminating these cases would not have changed the CPHA data.

The "no report or not coded" column of the preceding table for all selected surgeries, as a group, shows that 17.7 percent of the civilian hospital cases are in this category. About 15 percent were accounted for by cases which were not coded by the pathologist, about one-third of which related to hospitals which did not code the tissue for any of their surgeries. (See app. IV.) According to CPHA, some hospitals routinely do not include tissue coding on the patient abstracts sent to them.

We do not know, with the data available to us, how the cases for which information is not available would be distributed between the various categories of diseased tissue (A and B) and no disease. These cases could be distributed in the same general pattern as the coded cases. However, most cases for which information is not available might be cases in which no disease was present. If this were the situation and the percentage of cases with no information is high, the information presented by the coded cases alone would be distorted.

In any comparison of the data from military hospitals with that from civilian hospitals, the possible effects of the unknown percentages of diseased and nondiseased tissue in the "no report or not coded" category must be borne in mind.

Because of the significant number of surgeries done in civilian hospitals where the tissue was not coded, we prepared a separate table (see p. 12) showing a percentage comparison using only those surgeries which were coded diseased A and B or no disease.

Results of Tissue Coding During 1971  
at Selected Military and Civilian Hospitals  
Percent of Occurrences--All Cases Coded

<u>Procedure</u>	<u>Diseased A</u> (note a)	<u>Diseased B</u> (note b)	<u>No disease</u>
Laminectomy:			
Military	24.3	75.7	-
Civilian	50.0	33.5	16.5
Tonsillectomy:			
Military	74.5	25.5	-
Civilian	31.7	65.4	2.9
Tonsillectomy and adenoidectomy:			
Military	68.6	31.4	-
Civilian	22.8	72.0	5.2
Adenoidectomy:			
Military	76.9	15.7	7.4
Civilian	26.7	64.2	9.1
Appendectomy:			
Military	80.8	7.9	11.3
Civilian	75.6	11.9	12.5
Cholecystectomy:			
Military	94.4	5.6	-
Civilian	78.7	20.6	.7
Mastectomy:			
Military	97.2	2.8	-
Civilian	74.9	24.3	.8
Abdominal hysterectomy:			
Military	71.0	23.5	5.5
Civilian	62.7	33.0	4.3
Vaginal hysterectomy:			
Military	38.3	47.3	14.4
Civilian	43.1	46.1	10.8
All:			
Military	71.0	23.0	6.0
Civilian	54.0	41.0	5.0

<sup>a</sup>Tissue disease which generally requires surgical removal.

<sup>b</sup>Tissue disease where surgical removal is not clearly indicated from the pathological findings alone.

CPHA provided us with tissue-coding data by size of hospital, expected method of payment, census region, and type of hospital--teaching or nonteaching. The following tables show the percentages--based on all cases not only on those which were coded--of nondiseased tissue by these various subcategories.

Patients with Nondiseased Tissue

at Civilian Hospitals

by Size of Hospital

<u>Surgical procedure</u>	<u>Hospitals (note a)</u>				
	<u>All</u>	<u>Small</u>	<u>Medium small</u>	<u>Medium large</u>	<u>Large</u>
Laminectomy	6.8%	10.5%	9.0%	8.4%	4.8%
Tonsillectomy	2.3	2.1	1.1	2.7	2.6
Tonsillectomy and adenoidectomy	4.0	1.2	4.8	2.7	5.3
Adenoidectomy	7.1	9.1	7.9	4.8	8.0
Appendectomy	10.7	10.7	7.8	11.1	11.8
Cholecystectomy	.6	.8	.4	.7	.6
Mastectomy	.7	.5	.7	.7	.7
Abdominal hysterectomy	3.7	3.5	3.0	3.4	4.3
Vaginal hysterectomy	9.2	4.5	4.7	7.8	11.8
All	4.1	3.1	3.5	3.7	4.0

<sup>a</sup>CPHA defines the size of hospitals as follows:

Small hospital--less than 5,000 discharges a year

Medium small--5,000 to 9,999 discharges a year

Medium large--10,000 to 14,999 discharges a year

Large--15,000 or more discharges a year

Small hospitals show a rather low rate (4.5 percent) of nondiseased tissue in vaginal hysterectomies; 30 percent of the tissue from vaginal hysterectomies at these small hospitals was not coded compared with 10 percent for large hospitals. The large hospitals had the highest rates of nondiseased tissue in four procedures--tonsillectomy and adenoidectomy, appendectomy, mastectomy, and vaginal hysterectomy--and were lowest in laminectomy. The small hospitals were highest in three procedures--laminectomy, adenoidectomy, and cholecystectomy--and were lowest in three--tonsillectomy and adenoidectomy, mastectomy, and vaginal hysterectomy.

Patients with Nondiseased Tissue

at Civilian Hospitals

by Expected Method of Payment (note a)

<u>Surgical procedure</u>	<u>All</u>	<u>Insurance</u>			<u>Patient or family (note b)</u>
		<u>Blue Cross</u>	<u>Commer- cial</u>	<u>Medicare</u>	
Laminectomy	6.8%	5.6%	6.3%	9.4%	5.1%
Tonsillectomy	2.3	2.4	2.2	2.4	3.1
Tonsillectomy and adenoidectomy	4.0	3.9	4.2	3.2	4.4
Adenoidectomy	7.1	7.7	7.6	-	5.0
Appendectomy	10.7	11.1	10.8	5.7	9.7
Cholecystectomy	.6	.6	.8	.4	.6
Mastectomy	.7	.6	.6	1.1	.7
Abdominal hysterectomy	3.7	3.9	4.1	.9	3.0
Vaginal hysterectomy	9.2	9.0	10.9	4.3	7.3
All	4.1	4.1	4.5	1.5	4.5

<sup>a</sup>CPHA compiles data on eight different methods of payment. The methods shown in this table are those in which the Subcommittee was particularly interested.

<sup>b</sup>Cases in which patient was not covered by insurance and in which he or his family would be expected to pay bill.

Blue Cross patients had the highest rates of nondiseased tissue in two procedures--adenoidectomy and appendectomy--and the lowest in one procedure--mastectomy. Commercial insurance patients were highest in three procedures--cholecystectomy, abdominal hysterectomy, and vaginal hysterectomy--and lowest in two--tonsillectomy and mastectomy. Medicare patients were highest in two procedures--laminectomy and mastectomy--and lowest in five procedures--tonsillectomy and adenoidectomy, appendectomy, cholecystectomy, abdominal hysterectomy, and vaginal hysterectomy.

Patients with Nondiseased Tissue  
at Civilian Hospitals  
by Census Region

<u>Surgical</u> <u>procedural</u>	<u>Census region</u>				
	<u>All</u>	<u>East</u> <u>(note a)</u>	<u>Central</u> <u>(note b)</u>	<u>South</u> <u>(note c)</u>	<u>West</u> <u>(note d)</u>
Laminectomy	6.8%	5.3%	8.8%	6.4%	6.9%
Tonsillectomy	2.3	2.0	2.3	3.9	1.2
Tonsillectomy and adenoidectomy	4.0	3.5	2.6	6.9	3.3
Adenoidectomy	7.1	4.1	5.6	8.6	11.1
Appendectomy	10.7	11.3	9.7	11.6	10.3
Cholecystectomy	.6	.7	.8	.3	.6
Mastectomy	.7	.5	.9	.7	.6
Abdominal hysterectomy	3.7	3.0	5.0	2.8	4.3
Vaginal hysterectomy	9.2	5.9	9.2	10.5	9.2
All	4.1	3.5	3.8	5.0	4.0

<sup>a</sup>States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania.

<sup>b</sup>Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

<sup>c</sup>Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas.

<sup>d</sup>Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming, Alaska, California, Hawaii, Oregon, and Washington.

The hospitals in the central region had the highest rates of nondiseased tissue in four procedures--laminectomy, cholecystectomy, mastectomy, and abdominal hysterectomy--and the lowest rates in two procedures--tonsillectomy and adenoidectomy and appendectomy. Hospitals in the east were not highest in any of the procedures and were lowest in four procedures--laminectomy, adenoidectomy, mastectomy, and vaginal hysterectomy. Hospitals in the south were highest in four--tonsillectomy, tonsillectomy and adenoidectomy, appendectomy, and vaginal hysterectomy--and lowest in two--cholecystectomy and abdominal hysterectomy. Hospitals in the west were highest in one procedure--adenoidectomy--and lowest in one procedure--tonsillectomy.

Patients with Nondiseased Tissue  
at Civilian Hospitals  
by Teaching and Nonteaching Hospitals

<u>Surgical procedure</u>	<u>Hospitals</u>		
	<u>All</u>	<u>Teaching</u> <u>(note a)</u>	<u>Nonteaching</u>
Laminectomy	6.8%	5.1%	9.0%
Tonsillectomy	2.3	3.2	1.4
Tonsillectomy and adenoidectomy	4.0	4.6	3.4
Adenoidectomy	7.1	6.2	8.5
Appendectomy	10.7	11.8	9.8
Cholecystectomy	.6	.6	.6
Mastectomy	.7	.6	.7
Abdominal hysterectomy	3.7	4.0	3.2
Vaginal hysterectomy	9.2	10.0	8.3
All	4.1	4.5	3.7

<sup>a</sup>Hospitals having internship or residency training programs, approved by the American Medical Association, in medicine, pediatrics, obstetrics-gynecology, surgery, or pathology.

NONDISEASED TISSUE RATE BY HOSPITALS

The data which CPHA furnished permitted an analysis of the results of tissue coding by numbers of hospitals and by numbers of patients. In response to the Subcommittee's interest, the tables below are analyses of the number of hospitals in which 10 percent or more and 20 percent or more of all patients for the selected procedure at the particular hospital had tissue removed which was coded as nondiseased. The percentages are based on all cases at each hospital not only on those which were coded.

Civilian Hospitals and Affected Patients in Which 10 Percent or More of Patients Had Tissue Coded as Nondiseased

<u>Procedure</u>	<u>Number of hospitals</u>		<u>Number of patients</u>
	<u>Doing procedure</u>	<u>Where 10 percent or more of patients had nondiseased tissue</u>	
Laminectomy	124	25	88
Tonsillectomy	192	11	197
Tonsillectomy and adenoidectomy	194	12	1,370
Adenoidectomy	134	13	171
Appendectomy	198	92	1,433
Cholecystectomy	198	3	6
Mastectomy	196	9	16
Abdominal hysterectomy	197	29	392
Vaginal hysterectomy	184	41	832
Total			<u>4,505</u>

Overall, tissue from 6,087 patients at all hospitals included in the sample was coded as nondiseased. (See p. 32.) The 4,505 patients shown above represent 74 percent of the 6,087.

Civilian Hospitals and Affected  
Patients in Which 20 Percent or More of  
Patients Had Tissue Coded as Nondiseased

<u>Procedure</u>	<u>Number of hospitals</u>		<u>Number of patients</u>
	<u>Doing procedure</u>	<u>Where 20 percent or more of patients had nondiseased tissue</u>	
Laminectomy	124	14	61
Tonsillectomy	192	6	150
Tonsillectomy and adenoidectomy	194	8	1,264
Adenoidectomy	134	10	144
Appendectomy	198	23	409
Cholecystectomy	198	-	-
Mastectomy	196	3	3
Abdominal hyster- ectomy	197	18	141
Vaginal hyster- ectomy	184	16	<u>583</u>
Total			<u>2,755</u>

The 2,755 patients represent 45 percent of the total 6,087 patients at all hospitals included in sample whose tissue was coded as nondiseased.

## CHAPTER 3

### COMPARISON OF BLOOD USE IN CHOLECYSTECTOMIES

#### AT CERTAIN MILITARY AND CIVILIAN HOSPITALS

Our comparison showed that during calendar year 1971 about the same percent of cholecystectomy patients in the selected civilian and military hospitals received blood transfusions. The Subcommittee was specifically interested in the number of patients who received one-unit transfusions because some medical experts thought that the patient might face greater dangers from receiving one unit of blood than from receiving no blood at all. We found that about 29 percent of the cholecystectomy patients given transfusions in military hospitals received one unit whereas about 37 percent of such patients given transfusions in civilian hospitals received one unit. A comparison of military and civilian hospital blood use by rates of hemoglobin and hematocrit (see below) is not possible because of the absence of detailed data on each patient's condition during or after surgery.

The table below shows a summary on the blood use data for all cholecystectomies in 1971 at the selected hospitals.

	<u>Military</u>	<u>Civilian</u>
Total cholecystectomies	1,162	21,548
Total patients given transfusions	63 (5.4%)	1,212 (5.6%)
Patients receiving one unit of blood	18 (29%)	452 (37%)

Whether a patient receives blood during surgery is dependent on a number of factors, including the rates of hemoglobin and/or hematocrit, before surgery.

Hemoglobin is that portion of the blood which is responsible for bringing oxygen to the tissues. It is measured in grams percent, the normal being about 14 grams in men and 13 grams in women. A low hemoglobin concentration is indicative of anemia.

Hematocrit is a method of determining the relative amounts of plasma and of blood cells in the blood. It is

measured as the volume of packed red cells per 100 cubic centimeters of blood. As with hemoglobin determination, it is commonly used to indicate presence or absence of anemia. It can also be used to assist in the diagnosis of a variety of other conditions and as an aid to postoperative transfusion therapy. The normal value is about 45 percent in men and 40 percent in women.

BLOOD USE AT CIVILIAN HOSPITALS

The following schedules show the use of blood as it relates to the patients' hemoglobin or hematocrit rates at time of admission. These rates may or may not have been the rates immediately before surgery. The admission rates were gathered because they were the only rates that CPHA had compiled for civilian hospitals. Since CPHA member hospitals may report either hemoglobin rates or hematocrit rates for each patient, the data is presented separately for each type of rate.

Summary of Blood Use at 200 CPHA Hospitals

	<u>Number of patients</u>	<u>Number of patients receiving</u>	
		<u>Trans- fusions</u>	<u>One unit</u>
Hospitals reporting hemoglobin rate:			
Female	8,745	419	171
Male	2,881	217	85
Hospitals reporting hematocrit rate:			
Female	7,405	378	144
Male	<u>2,516</u>	<u>198</u>	<u>52</u>
Total	<sup>a</sup> <u>21,547</u>	<u>1,212</u>	<u>452</u>

<sup>a</sup>The CPHA hospitals had 21,548 cholecystectomy patients. For one patient, the CPHA data did not show the sex.

Blood use by Hemoglobin Rates for Female Patients  
At 104 CPHA Hospitals Reporting Hemoglobin Data

Hemoglobin rate (note a)	Number of patients	Number of patients receiving transfusions	Number of patients receiving			
			One unit	Two units	Three to eight units	Nine or more units
1 to 6	8	6 (75%)	-	1	4	1
7 and 8	23	18 (78.3%)	5	4	9	-
9 and 10	143	64 (44.8%)	26	26	9	3
11 and 12	2,053	130 ( 6.3%)	57	42	26	5
13 and 14	5,131	153 ( 3.0%)	60	53	35	5
15 and 16	1,211	39 ( 3.2%)	20	14	3	2
17 and 18	45	5 (11.1%)	1	1	3	-
19 and 20	4	-	-	-	-	-
21 +	14	-	-	-	-	-
Rate not coded	<u>113</u>	<u>4</u> ( 3.5%)	<u>2</u>	<u>2</u>	<u>-</u>	<u>-</u>
Total	<u>8,745</u>	<u>419</u> ( 4.8%)	<u>171</u>	<u>143</u>	<u>89</u>	<u>16</u>

<sup>a</sup>Normal rate for females is about 13.

Blood Use by Hemoglobin Rates for Male Patients  
At 104 CPHA Hospitals Reporting Hemoglobin Data

Hemoglobin rate (note a)	Number of patients	Number of patients receiving transfusions	Number of patients receiving			
			One unit	Two units	Three to eight units	Nine or more units
1 to 6	4	4 (100%)	-	-	1	3
7 and 8	7	5 (71.4%)	-	1	3	1
9 and 10	34	19 (55.9%)	2	6	11	-
11 and 12	206	41 (19.9%)	15	12	13	1
13 and 14	1,011	73 ( 7.2%)	32	18	20	3
15 and 16	1,355	60 ( 4.4%)	29	15	11	5
17 and 18	208	11 ( 5.3%)	4	1	5	1
19 and 20	13	1 ( 7.7%)	1	-	-	-
21 +	2	-	-	-	-	-
Rate not coded	<u>41</u>	<u>3 ( 7.3%)</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>-</u>
Total	<u>2,881</u>	<u>217 ( 7.5%)</u>	<u>85</u>	<u>53</u>	<u>65</u>	<u>14</u>

<sup>a</sup>Normal rate for males is about 14.

Blood Use by Hematocrit Rates for Female Patients  
at 96 CPHA Hospitals Reporting Hematocrit Data

Hematocrit rate (note a)	Number of patients	Number of patients receiving transfusions	Number of patients receiving			
			One unit	Two units	Three to eight units	Nine or more units
1 to 20	50	7 (14%)	1	1	4	1
21 to 25	8	8 (100%)	-	3	4	1
26 to 30	60	36 (60%)	10	9	15	2
31 to 35	501	109 (21.8%)	50	33	24	2
36 to 40	3,090	135 ( 4.4%)	51	54	28	2
41 to 45	3,049	68 ( 2.2%)	27	23	14	4
46 to 50	557	12 ( 2.2%)	4	5	3	-
51 to 55	33	-	-	-	-	-
56 to 60	2	-	-	-	-	-
61 +	2	-	-	-	-	-
Not coded	<u>53</u>	<u>3 ( 5.7%)</u>	<u>1</u>	<u>2</u>	<u>-</u>	<u>-</u>
Total	<u>7,405</u>	<u>378 ( 5.1%)</u>	<u>144</u>	<u>130</u>	<u>92</u>	<u>12</u>

<sup>a</sup>Normal rate for females is about 40.

Blood Use by Hematocrit Rates for Male Patients  
At 96 CPHA Hospitals Reporting Hematocrit Data

Hematocrit rate (note a)	Number of patients	Number of patients receiving transfusions	Number of patients receiving			
			One unit	Two units	Three to eight units	Nine or more units
1 to 20	8	3 (37.5%)	1	-	1	1
21 to 25	3	3 (100%)	-	-	2	1
26 to 30	22	17 (77.3%)	1	2	11	3
31 to 35	68	29 (42.6%)	5	12	12	-
36 to 40	354	35 ( 9.9%)	8	16	10	1
41 to 45	1,095	71 ( 6.5%)	28	21	19	3
46 to 50	814	32 ( 3.9%)	8	10	8	6
51 to 55	121	5 ( 4.1%)	1	2	-	2
56 to 60	6	-	-	-	-	-
61+	3	1 (33.3%)	-	-	1	-
Not coded	<u>22</u>	<u>2 ( 9.1%)</u>	<u>-</u>	<u>1</u>	<u>1</u>	<u>-</u>
Total	<u>2,516</u>	<u>198 ( 7.9%)</u>	<u>52</u>	<u>64</u>	<u>65</u>	<u>17</u>

<sup>a</sup>Normal rate for males is about 45.

BLOOD USE AT MILITARY HOSPITALS

The following schedules show the use of blood by hemoglobin and hematocrit rates at military hospitals. Because of the relatively small number of cholecystectomies in the military hospitals, both male and female patients have been combined. In the military data, males accounted for 43 percent of the patients given transfusions. In the civilian hospitals, 34 percent of the patients given transfusions were males.

Summary of Blood Use at 19 Military Hospitals

	<u>Patients receiving transfusions</u>	<u>Receiving one unit</u>
Patients from hospitals reporting hemoglobin rate	30	9
Patients from hospitals reporting hematocrit rate	<u>33</u>	<u>9</u>
Total	<u>63</u>	<u>18</u>

Blood Use by Hemoglobin Rates at Military Hospitals

Hemoglobin rate (note a)	Patients receiving transfusions	Patients receiving			
		One unit	Two units	Three to eight units	Nine or more units
1 to 6	-	-	-	-	-
7 and 8	1	-	-	1	-
9 and 10	4	-	3	1	-
11 and 12	5	1	3	1	-
13 and 14	11	5	2	3	1
15 and 16	5	2	2	1	-
17 and 18	2	-	1	-	1
19 and 20	1	1	-	-	-
21+	-	-	-	-	-
Rate not coded	<u>1</u>	-	-	-	<u>1</u>
Total	<u>30</u>	<u>9</u>	<u>11</u>	<u>7</u>	<u>3</u>

<sup>a</sup>Normal rate is 13 to 14.

Blood Use by Hematocrit Rates at Military Hospitals

Hematocrit rate (note a)	Patients receiving transfusions	Patients receiving			
		One unit	Two units	Three to eight units	Nine or more units
0 to 20	-	-	-	-	-
21 to 25	1	-	-	1	-
26 to 30	4	-	-	2	2
31 to 35	9	1	4	2	2
36 to 40	5	2	-	2	1
41 to 45	8	5	1	2	-
46 to 50	6	1	-	5	-
51 to 55	-	-	-	-	-
56 to 60	-	-	-	-	-
61+	-	-	-	-	-
Total	<u>33</u>	<u>9</u>	<u>5</u>	<u>14</u>	<u>5</u>

<sup>a</sup> Normal rate is about 40 to 45.

## CHAPTER 4

### SCOPE OF REVIEW

The Subcommittee requested comparative data on tissue coding at military and civilian hospitals for nine types of surgical procedures. Some of these procedures were broadly stated; to make meaningful comparisons, it was necessary to obtain data on five types of mastectomies, three types of abdominal hysterectomies, and two types of vaginal hysterectomies and combine them into three procedure groups requested (mastectomies, abdominal hysterectomies, and vaginal hysterectomies). (See app. V.)

We sampled 554 of about 9,700 patient records pertaining to the 9 procedures done during 1971 at the 19 military hospitals (see app. I) staffed by professional medical records librarians. We drew independent samples of surgical procedures from all the selected procedures at each military hospital. The sampling plan was designed to develop estimates for tissue coding for surgical procedures at all 19 military hospitals as a group. The plan was not designed to compare individual military hospitals with each other or to compare individual military hospitals with individual civilian hospitals.

The samples were drawn from military hospital reports which classified the surgeries according to the International Classification of Diseases, Adapted, published by the National Center for Health Statistics, Public Health Service, Department of Health, Education, and Welfare, for use in the United States. CPHA uses a similar system. After the cases were selected, a pathologist at the military hospital reviewed the patient medical records and the pathological report on the tissue removed for each selected surgery and coded the tissue according to CPHA-established criteria. (See pp. 8 and 9.) Military hospitals normally do not do such coding.

We reviewed available patient and hospital records for 1,162 of the 1,207 cholecystectomies performed during 1971 at the above military hospitals to determine the number of units of whole blood, packed red cells, or both, used, and the hemoglobin and hematocrit levels of these

patients at time of admission. Records on the remaining 45 surgeries pertained to patients who had transferred to other hospitals or whose records were missing for unknown reasons or pertained to cases erroneously recorded as cholecystectomies.

CPHA compiled the data on tissue coding and blood use for civilian hospitals during 1971 from its sample of 200 hospitals. CPHA believes that the sample is representative of non-Federal short-term general hospitals in the United States. CPHA furnished us with the tissue-coding data on 148,426 patients who had undergone the selected surgeries as their most important operation. This means that, if the patient had more than one type of surgery, we were furnished data on the most important type.

The CPHA data came from 124 to 198 hospitals depending on the type of surgery, since all 200 hospitals did not do all the selected surgeries. A detail listing of the number of patient and hospitals by types of surgery is shown in appendix II. CPHA also provided data on blood use for 1,212 patients who received blood in cholecystectomies.

## MILITARY HOSPITALS

## WHERE DATA WAS OBTAINED

<u>Hospital</u>	<u>Location</u>
Army:	
William Beaumont Army Hospital	El Paso, Texas
Brooke Army Hospital	San Antonio, Texas
Fitzsimmons General Hospital	Denver, Colo.
Ireland Army Hospital	Fort Knox, Ky.
Letterman General Hospital	San Francisco, Calif.
Walter Reed General Hospital	Washington, D.C.
Fort Carson Army Hospital	Colorado Springs, Colo.
Air Force:	
USAF Hospital, Hamilton AFB	San Rafael, Calif.
USAF Medical Center, Wright Patterson AFB	Dayton, Ohio
USAF Regional Hospital, Eglin AFB	Valparaiso, Fla.
Wilford Hall USAF Medical Center, Lackland AFB	San Antonio, Texas
USAF Regional Hospital, Shepherd AFB	Wichita Falls, Texas
USAF Regional Hospital, Maxwell AFB	Montgomery, Ala.
Malcolm Grow USAF Medical Center, Andrews AFB	Camp Springs, Md.
David Grant USAF Medical Center, Travis AFB	Fairfield, Calif.
USAF Hospital, Barksdale AFB	Shreveport, La.
USAF Regional Hospital, Carswell AFB	Fort Worth, Texas
USAF Regional Hospital, March AFB	Riverside, Calif.
USAF Regional Hospital, Langley AFB	Hampton, Va.

APPENDIX II

SUMMARY OF CPHA DATA ON CIVILIAN HOSPITALS

By Surgical Procedure

	<u>Hospitals</u>	<u>Patients</u>
Laminectomy	124	1,990
Tonsillectomy	192	13,246
Tonsillectomy and adenoidectomy	194	37,279
Adenoidectomy	134	2,599
Appendectomy	198	16,858
Cholecystectomy	198	21,548
Mastectomy	196	19,828
Abdominal hysterectomy	197	24,317
Vaginal hysterectomy	184	<u>10,761</u>
Total		<u>148,426</u>

By Tissue Code

	<u>Number of patients</u>	<u>Percent</u>
Diseased A	66,062	44.51
Diseased B	50,063	33.73
No disease	6,087	4.10
Not coded by pathologist	22,216	14.97
No report	2,787	1.88
No tissue removed	1,176	.79
No code marked (note a)	<u>35</u>	<u>.02</u>
Total	<u>148,426</u>	<u>100.00</u>

<sup>a</sup>In these cases the data which CPHA received from member hospitals had none of the six codes (see pp. 8 and 9) marked.

## MILITARY HOSPITAL DATA--SAMPLING ERRORS

The data on tissue coding for surgeries at military hospitals was developed from random samples, taken separately at each hospital, of all surgical procedures of the specified types that were done in 1971. The estimates developed may differ somewhat from the results which would have been obtained if the tissue from all the specified surgical procedures had been coded. This difference is called the sampling error.

Table I below shows the expected sampling errors for the various individual surgical procedures. Table II gives the sampling errors for all surgical procedures combined. The tables should be used in connection with page 10 of this report. The sampling errors are stated at the 95-percent confidence level. This means the estimate would differ in only 1 chance in 20 from the results of coding all surgical procedures by more than the sampling error shown.

Table I--Individual Surgical Procedures

If the estimated rate  
of occurrence is            The sampling error is

(Percent)

Less than 5	2.0
5 to 10	4.0
10 to 20	7.5
20 to 30	11.5
30 to 40	14.0
40 to 50	16.0
50 to 60	16.0
60 to 70	14.0
70 to 80	11.5
80 to 90	7.5
90 to 95	4.0
95 or more	2.0

APPENDIX III

Table II--All Surgical Procedures Combined

<u>Code</u>	<u>Rate of occurrence</u>	<u>Sampling error</u>
	(Percent)	
Diseased A	68.04	3.10
Diseased B	22.07	2.66
A and B combined	90.11	2.22
No disease	5.72	1.88
No report or not coded	4.16	1.32